National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
White Sands Test Facility
P.O. Box 20
Las Cruces, NM 88004-0020

Reply to Attn of:

June 12, 2003

RF-03-111

Lockheed Martin Space Mission Systems & Services
Attn: Ms. Christina Hardeway/MS B22
2400 NASA Road One
Houston, TX 77058

SUBJECT Corrected Materials Test Data Transmittal

Enclosed is the corrected copy of WSTF 03-37454 performed at the NASA Johnson Space Center White Sands Test Facility (WSTF) laboratories. The report was transmitted with the following error:

- A calibration check of the balance used to weigh this article revealed that the required accuracy of the weight measurement according to NASA-STD-6001 might not have been met. The weight of the article was adjusted to reflect the accuracy of the nearest weight measurement checkpoint.

All changes have been made and are indicated on the corrected copy by revision bars. Please replace the original report, transmitted earlier, with the enclosed corrected copy.

Please direct any questions that may arise from this data transmittal to Dave Baker at telephone (505) 524-5605.

Harry T. Johnson
Chief, Laboratories Office

Enclosure

cc:
LMES/C45/A. Tucker

CORRECTED COPY

NASA JSC TEST REQUEST

Note to test facility: A copy of this request should be returned with test report.

OFFICE USE ONLY

TEST FACILITY I. D. NUMBER: 03-37454

NAME: Andrew Tucker	ORGANIZATION: Lockheed Martin
ADDRESS: 2400 NASA Rd One Mail Code C45 Houston, Tx 77058	COORDINATOR: ch REQUEST NO.: 12462 TEST FACILITY: WSTF
DATE: January 22, 2003	PHONE: 281-483-7451 (Alternatively, also Micah Johnson at 281-483-7422) CODE:

1. MANUFACTURER'S IDENTIFICATION (Item Description): MD8 Air Sampling Device		2. MANUFACTURER'S NAME: Sartorious	
3. SPECIFICATION	4. CHEMICAL CLASS: Assembly	5. GENERIC USE	
6. CHECK CATEGORY NASA-STD-6001: ☐ A ☐ B ☒ C	7. TEST REQUIRED NASA STD-6001: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☒ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ VCM ☐ TQCM ☐ SPECIAL ☐ VAC BAKE		
8. VEHICLE: ISS and Shuttle	7. PART NUMBER & SERIAL NO.: 17801	8. PROJECT: HRF	9. USE TEMPERATURE: Ambient; Cabinet
12. USE ATMOSPHERE/FLUID	13. IGNITER TYPE	14. USE PRESSURE: Std Cabin Pressure; 14.7psi	15. USE THICKNESS
16. INTENDED APPLICATION: Air Sampling		17. QUANTITY INHABITABLE AREA/HAZARDOUS FLUID/VACUUM	
18. CURE TIME	19. CURE TEMPERATURE	20. CURE PRESSURE	
21. TEST ARTICLE WEIGHT: 4.5 kg	22. TEST ARTICLE AREA: 12" x 6" x 6"	23. NUMBER OF ITEMS TESTED: 1	24. NUMBER OF ITEMS TO BE FLOWN
25. TEST CHAMBER VOLUME	26. TEST CHAMBER ATMOSPHERE: 20.9% O2/79.1% N2	27. TEST CHAMBER PRESSURE: 11.8 ~ 12.0 psia	28. TEST CHAMBER TEMPERATURE
29. TEST CHAMBER DURATION	30. CLEANING SPEC	31. MATERIAL CODE	32. PHOTOGRAPHIC COVERAGE: ☐ VIDEO ☒ STILLS ☐ NONE

33. SPECIAL INSTRUCTIONS

1. Hardware to be tested is listed below:

   Air Sampling Device Part # 17801

2. Record Test Chamber Volume.

3. Contact Andrew Tucker (281-483-7451) or Micah Johnson (281-483-7422) when hardware arrives at testing facility and when hardware has completed offgass testing.

JSC Form 2035

CORRECTED COPY

AUTHORIZATIONS, SPECIAL INSTRUCTIONS, AND NOTES

FROM	DATE	INSTRUCTIONS
WSTF	--	The test article was returned to the requested address.

NASA STD 6001
TEST 7: DETERMINATION OF OFFGASSED PRODUCTS
NON-STANDARD TEST *

ASSEMBLED ARTICLE

MD8 Air Sampling Device

TEST ARTICLE DESCRIPTION

Weight: 2632 g

Preparation Information

The test article consisted of a MD8 Air Sampling Device with four plastic adapters.

Pretest Photograph(s): NASA-WSTF 0203-0252

TEST CONDITIONS

Test Chamber Volume: 34.5 liters

Test Atmosphere: 79.1% Nitrogen
20.9% Oxygen

Test Pressure: 82.0 kPa (11.9 psia)

Test Temperature: 49 °C (120 °F)

Test Duration: 72 Hr

Additional Information

The concentration of nitrogen dioxide in the test matrix gas cannot be verified at the specification limit. *

CORRECTED COPY

TEST RESULTS, OBSERVATIONS, AND COMMENTS

TABLE 1. TEST RESULTS

Component	NASA Code	SMAC (milligrams/ cubic meter)	Quantity (micrograms /assembled article)
1,1-Dichloro-1-fluoroethane	071585	150	130
1,3-Dioxolane	055100	36	39
1-Methoxy-2-propanol	014950	73.7	7400
1-Methoxy-2-propyl acetate	045630	61	5800
3-Methylpentane	095400	176	3.3
Acetaldehyde	020300	4	38
Acetone	110500	50	490
Benzene	030400	1.5	22
Butene	097601	57	5.0
Butylbenzene	033700	55	86
Butyraldehyde	021500	17.7	6.9
C12 Ketones	119703	0.1	220
C7 Ketone	118711	23.5	39
C7 Saturated and unsaturated aliphatic hydrocarbons	098540	201	18
C8 Saturated aliphatic hydrocarbon	098741	228.19	4.5
C9-C10 Aromatic hydrocarbons	038210	15	2400
Carbon disulfide	121000	3.1	43
Carbon monoxide	161000	10	180
Carbonyl sulfide	122000	4.9	54
Cyclohexane	091650	205.16	320
Dichloromethane	064200	50	360
Dimethoxymethane	050500	114.5	170
Ethylbenzene	031600	130	300

TABLE 1. TEST RESULTS

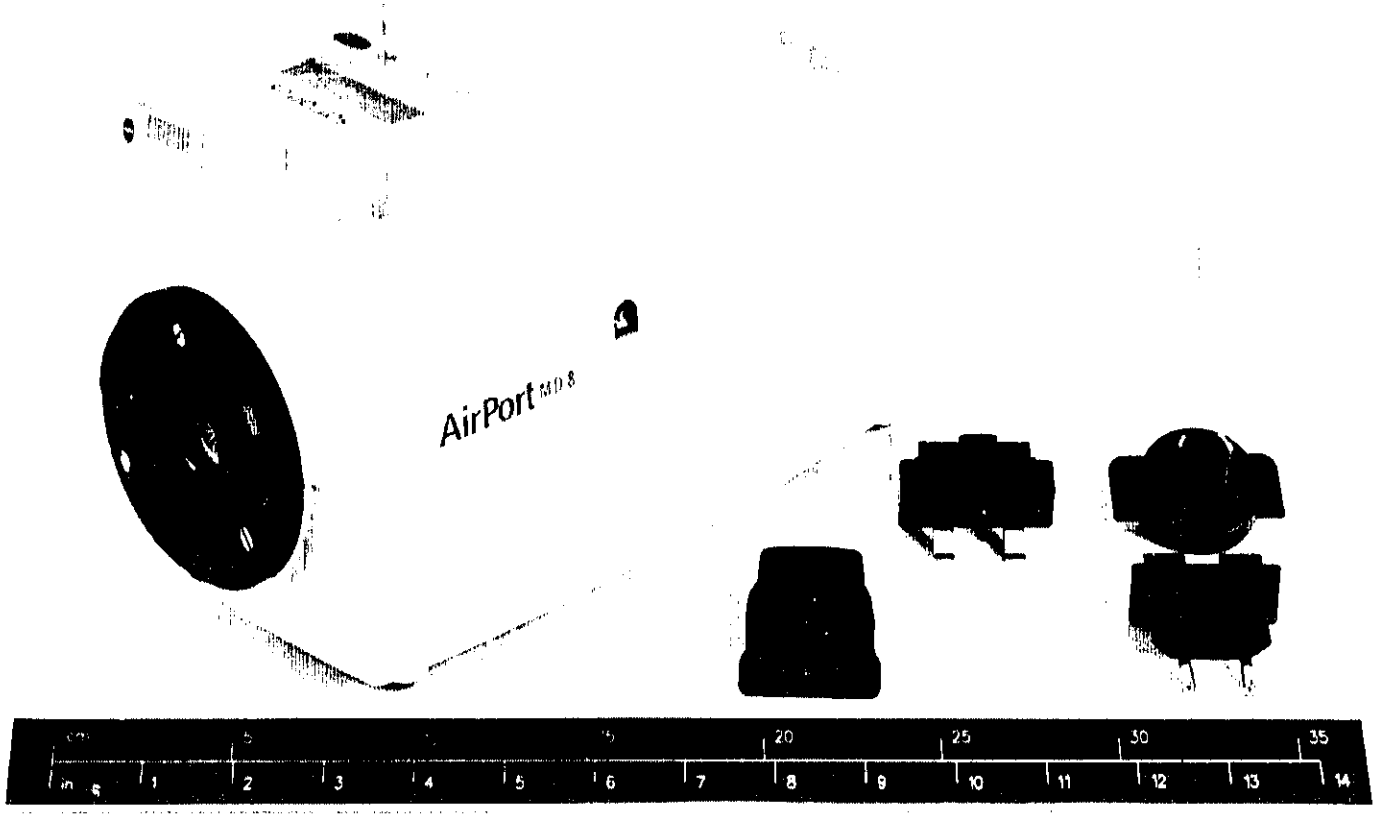
Component	NASA Code	SMAC (milligrams/ cubic meter)	Quantity (micrograms /assembled article)
Ethylcyclobutane	092840	5	14
Heptane	093750	204.47	37
Hexamethylcyclotrisiloxane	164500	90	100
Hexane	094200	176	9.0
Hydrogen	161500	340	720
Isopropylbenzene	030800	73.27	110
Methane	094500	3800	11
Methyl alcohol	014800	9	180
Methyl ethyl ketone	115000	30	33
n-Butane	090600	236.57	1.7
n-Butyl acetate	041200	189.11	8700
n-Butyl alcohol	011600	80	780
n-Propyl acetate	045600	166.78	16
Propylbenzene	034000	48.92	250
t-Butyl alcohol	012400	120.73	4900
Toluene	035200	60	27
Trimethyl benzenes	038851	60.3	2800
Unidentified nitrogen containing component	999961	0.1	28
Unidentified nitrogen containing component	999961	0.1	4.9
Xylenes	039100	220	2800

Note(s): Toxic Hazard Index (T) 0.049 is based on use of the assembled item in a 65-cubic-meter spacecraft.

A SMAC Value of 0.1 milligrams/cubic meter is a conservatively low default value assigned initially to components for which toxicity data are not available. The T value is subject to change as toxicity data become available for these compounds.

Observations and Comments

Calibration check of the balance used to weigh this article revealed that the required accuracy of the weight measurement according to NASA-STD-6001 might not have been met. The weight of the article has been adjusted to reflect the accuracy of the nearest weight measurement checkpoint.



WSTF NO. 03-37454
MD8 Air Sampling Device
NASA-STD-6001 TEST 7

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
White Sands Test Facility
P.O. Box 20
Las Cruces, NM 88004-0020

FEB 24 2003

Reply to Attn of RF

Lockheed Martin Space Mission Systems & Services
Attn: Ms. Christina Hardeway/MS B22
2400 NASA Road One
Houston, TX 77058

Subject: Materials Test Data Transmittal

Enclosed are the results of tests recently performed at the NASA Johnson Space Center (JSC) White Sands Test Facility (WSTF) laboratories. The test requests are identified by both JSC log number, if assigned, and WSTF log number.

Please direct any questions that may arise from this data transmittal to James Williams at telephone number (505) 524-5543.

James H. Williams
for

Harry T. Johnson
Chief, Laboratories Office

Enclosure

cc:
LMES/C45/A. Tucker

Post-it™ brand fax transmittal memo 7671	# of pages ▸
To MICAH JOHNSON	From ANDREW TUCKER
Co. Lockheed	Co.
Dept.	Phone # x37451
Fax # 483 4951	Fax # 244-5332

NASA JSC TEST REQUEST

Note to test facility: A copy of this request should be returned with test report.

OFFICE USE ONLY

TEST FACILITY I. D. NUMBER: 03-37454

NAME: Andrew Tucker	ORGANIZATION: Lockheed Martin
ADDRESS: 2400 NASA Rd One Mail Code C45 Houston, Tx 77058	PHONE: 281-483-7451 (Alternatively, also Micah Johnson at 281-483-7422)
DATE: January 22, 2003	

COORDINATOR: ch

REQUEST NO.: 12462

TEST FACILITY: WSTF

CODE:

1. MANUFACTURER'S IDENTIFICATION (Item Description): MD8 Air Sampling Device	2. MANUFACTURER'S NAME: Sartorious
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8. VEHICLE: ISS and Shuttle	7. PART NUMBER & SERIAL NO.: 17801
8. PROJECT: HRF	9. USE TEMPERATURE: Ambient; Cabinet
12. USE ATMOSPHERE/FLUID	13. IGNITER TYPE
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33. SPECIAL INSTRUCTIONS

1. Hardware to be tested is listed below:

   Air Sampling Device Part # 17801

2. Record Test Chamber Volume.

3. Contact Andrew Tucker (281-483-7451) or Micah Johnson (281-483-7422) when hardware arrives at testing facility and when hardware has completed offgass testing.

JSC Form 2035

AUTHORIZATIONS, SPECIAL INSTRUCTIONS, AND NOTES

FROM	DATE	INSTRUCTIONS
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TEST 7: DETERMINATION OF OFFGASSED PRODUCTS
NON-STANDARD TEST *

ASSEMBLED ARTICLE

MD8 Air Sampling Device

TEST ARTICLE DESCRIPTION

Weight: 2631.70 g

Preparation Information

The test article consisted of a MD8 Air Sampling Device with four plastic adapters.

Pretest Photograph(s): NASA-WSTF 0203-0252

TEST CONDITIONS

Test Chamber Volume: 34.5 liters

Test Atmosphere: 79.1% Nitrogen
20.9% Oxygen

Test Pressure: 82.0 kPa (11.9 psia)

Test Temperature: 49 °C (120 °F)

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Additional Information

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9

JOHNSON, MICAH (JSC-EB) (LM)

From: Kao, Henry [henry.kao@lmco.com]
Sent: Monday, September 23, 2002 3:32 PM
To: JOHNSON, MICAH (JSC-EB) (LM)
Cc: Gabiola, Rudy
Subject: RE: Materials Question for new device...

Micah,

All the nonmetallic materials that well be used on the IVA application have to be check on flammability and toxicity from material safety viewpoint. Regarding the toxicity, you mentioned the offgassing test data would be nice; but, I can't make assessment for you without exact test data. For flammability, as I knew the exterior housing of this Satorius Airport MD8 is made by polyurethane base foam and coated with polyurethane paint . Basically, polyurethane is a very flammable materials, a flammability configuration analysis per JSC 29353 is required for this nonmetallic housing.

Let me ask you some questions?

1. What is the maximum oxygen concentration in the use environment? 24.1%, 30% or higher?

2. If the total quantities of all the flammable materials used in this equipment is larger than 0.1 lb (or 6 linear inches dimension and/or 10 square inches in manned crew environments?

3. Is there any ignition source near to this equipment?

4. Is there any other flammable materials near to this equipment during the usage? If yes, what is this material and how far the distance?

5. Is there any fire propagation path with this equipment?

6. Is there any fire barrier materials around these equipment?

7. Is this equipment will be stowed in a container or exposed to the cabin environment? If they are stowed in a container, is it a sealed container or vented container?

8. At worst condition (short circus), what is the maximum power of this equipment ? and temperature will be?

9. Do you still have some other options for the housing materials of this equipment?

10. Could you cover or wrap this housing with some non-flammable materials?

11. If this equipment always will be stowed when not in use? How frequency and duration it will be exposed to cabin environment during the usage?

12. If this equipment is always hold or contacted with crew intimately during the usage?

All the information above should be helpful to conduct the flammability configuration analysis for this equipment.

Thanks,

Henry Kao

Materials Engineer Ph.D.

M&P Group/Lockheed Martin

Phone: (281) 333-7345

-----Original Message-----
From: JOHNSON, MICAH (JSC-EB) (LM) [mailto:micah.johnson1@jsc.nasa.gov]
Sent: Monday, September 23, 2002 10:14 AM
To: 'henry.kao@lmco.com'
Subject: Materials Question for new device...

Henry:

My name is Micah Johnson (we have spoke before on the SLAMMD Project) and I have a question regarding some materials issues on a new project that I working on currently. This project is still early in its development (requirements definition stage) but our team has already identified a possible candidate (COTS unit) to satisfy many of the "functional" requirements but just need to work out the environmental/workmanship/safety type requirements.
Basically, the device in mind is an Air Sampling Device to be used on the shuttle and ISS. The unit which we are looking at is called the Sartorius Airport MD8. I will attach a brief overview for it with this email, but I wanted to get a feel (if possible) where the materials standpoint is on such a device.

At this time, I can tell you that the device is "housed" in a hardened polyurethane foam housing with a RAL 9016 urethane based (Alexit 401) finish/coating. Not exactly sure what's on the inside yet, but I do know the unit is going to be stowed for most of the time and is a hand-held device that will be battery powered. I know devices are normally preferred to have an aluminum housing but design and fabrication of an aluminum housing for this device would cost much more than the device itself and therefore not a real viable option for us. I am working on obtaining more information, but I wanted to pass this by you and see if you had any thoughts, concerns or feelings regarding this hardware. Obviously it would be nice to have Offgas data but right now I do not have any to provide.

Anyway, please let know what you think and of course let me know if you have no answers at this time and need more data/information and hopefully I can get some for you. Thanks for your time Henry!

Micah Johnson
Lockheed Martin Space Operations
Phone: 281-483-7422
pgr: 281-527-0038
Cell: 512-554-4684

Outside:

Housing polyurethane foam.
Adapter in the housing for filter holder: aluminum AlCu MgPbF34137.
O-ring = perpunan DIN 3771-8L x 2,5-N-NBR 70

Countersunk head screw: 3x M4 x 20 DIN 963-A2 (Niro) steel
Pan head screw: M4 x 40 DIN84-Niro-A4 (niro) steel

Display foil: polyester PVS-G (autotype EB Antiglave, 130µm)

Laquer of housing: RAL 9016 urethan based, Alexit 401

Feet on the bottom part: PUR polyurethan.